1.4 Vegetation (from SNF, 1988)

Elevational range within this subbasin is very large, extending from less than 2,100 feet along the lower Salmon River to greater than 10,000 feet in the Lemhi Mountain Range. Thus, vegetation patterns are quite variable, from dry sagebrush/bunchgrass communities to typical western alpine flora. The Salmon River valley is typically rangeland with some irrigated agriculture.

In the lower Salmon River section of the subbasin, steepness and aspect strongly influence the vegetation type at lower elevations. South-facing exposures are typically composed of bluebunch wheatgrass, curly-leaved mountain mahogany, rabbitbrush, and sagebrush. North-facing aspects can be timbered with ponderosa pine and Douglas fir as well as lodgepole and aspen or cottonwood.

Farther up the Salmon River in the southern and eastern portions of the Salmon-Challis National Forest, lower elevations are less steep. Sagebrush/bunchgrass communities are found on south aspects, while north-facing aspects are dominated by Idaho fescue with a sparse overstory of Douglas fir.

Throughout the subbasin lower elevation shrub-dominated communities are highly intergraded with higher-elevation coniferous forests. There are no distinct lines between these two types of communities. For example, Douglas fir and lodgepole pine can be found growing on cooler aspects down into the sagebrush zone. Conversely, mountain big sagebrush communities reach up into the spruce/fir zone.

Precambrian Quartzite with the Challis Volcanics overlying the lower portions. The Precambrian sediments differ in this area due to their finer grain.

Along the western boundary are the Yellowjacket Mountains, the Blackbird range, Big Horn Crags, and Beartrap Ridge. Flat-topped mountains with steep V-shaped drainages characterize the Western portion (SCNF, 1993). Elevations in this area reach 8,450 feet. The Yellowjacket and Blackbird ranges are mainly made up of Precambrian metasediments and some intrusives that have undergone faulting (USDA, 1982). The rock types found in this area include garnet schist, phyllite, and quartzites. Cobalt, copper, and iron deposits are common throughout this area.

Along the northern edge of the watershed reside the Bitterroot Mountains. The Bitterroot Mountain range borders the north and north-eastern portions of the subbasin along the Idaho-Montana Border. The elevations along this boundary vary from 9,154 feet (Allan Mountain) to 5,734 feet along Lost Trail Pass. The dominant rock type is quartzite parent material made up of the Precambrian basement complex. A small intrusion of granite that makes up part of the Idaho Batholith is also located along this northern boundary. Landtypes of this area include steep canyonlands with a 60-90 percent gradient, mountain slopelands with V-shaped valleys, and Cryic uplands including those mountain ranges greater than 6,500 feet. Soils tend to be shallow to moderately deep in the mountains and moderately deep to deep in valley bottoms (SCNF, 1993).

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Forests follow typical zonation patterns with ponderosa pine and Douglas fir at lower elevations and a spruce/fir zone at higher elevations. In this subbasin, the spruce/fir zone is heavily dominated by lodgepole pine giving way to Douglas fir at lower portions of this zone. High- elevation forests typically have Engelmann spruce, subalpine fir, whitebark pine, and limber pine. The alpine zone starts at elevations ranging from 9,500 - 10,000 feet. Open parks and wet meadows, with species such as sedges, tufted hairgrass, bluegrass, American bistort, groundsel, fleabane, and geranium, are common throughout the forest.

The 2.4 million acres of Lemhi County are divided into 1.4 million acres of forest land and 1 million acres of nonforest land (Table 6). The majority of the forestland (approximately 1.3 million acres) is considered merchantable timberland. Of that 1.3 million acres of timberland, only 100,000 acres is found in ownership other than national forest (Table 7). Fifty percent of the timberland is in the Douglas fir forest type with another quarter of the area in lodgepole pine (Table 8). The remaining quarter of the timberland area includes spruce/fir, and ponderosa and other pines.

1.5 Fisheries

Bull Trout and Brook Trout

The entire Salmon-Panther subbasin is included in bull trout key watersheds as delineated by the State of Idaho Bull Trout Conservation Plan (Batt, 1996) (Figure 5 and 6). Key watersheds within the subbasin are called Owl Creek, Indian Creek, North Fork Salmon River, Panther Creek, Carmen Creek Area, and Hat/Iron Area.

Table 6 Land class area (in acres) for Lemhi County.

	Forest Land				Nonforest
All Land	Total	Timberland	Other Forest	Reserved	
2,410,300	1,390,200	1,313,500	76,700	0	1,020,100

Source: FIA Database Retrieval System (www.srsfia.usfs.msstate.edu/scripts/twig/)

Table 7 Timberland ownership acreage in Lemhi County.

All Owners	National Forest	BLM	State	Farmer/ Rancher	Private Corp.	Private Individual
1,313,500	1,214,200	66,600	13,000	6,200	3,600	9,900

Source: FIA Database Retrieval System (www.srsfia.usfs.msstate.edu/scripts/twig/)

Table 8 Area (acres) of timberland by forest type and ownership in Lemhi County.

		National	Other Public	

Forest Type	All Owners	Forest	(BLM and State Land)	Private
Spruce / Fir	114,500	114,500	0	0
Douglas fir	676,600	619,900	53,100	3,600
Ponderosa Pine	65,000	65,000	0	0
Lodgepole Pine	334,100	330,400	0	3,600
Other Pines	102,700	76,100	26,500	0
Conifer Total	1,292,900	1,206,000	79,600	7,300
Elm-Ash-Cottonwood	12,400	0	0	12,400
Nontyped	8,200	8,200	0	0
All Types Total	1,313,500	1.214,200	159,200	19,700

Source: FIA Database Retrieval System (www.srsfia.usfs.msstate.edu/scripts/twig/)

In the Allison Creek subwatershed, bull trout are found in the north and south forks as well as Poison, McKim, and Cow Creeks. In the Iron Creek subwatershed, bull trout have a strong resident population in Iron Creek as well as its north, south, and west forks. They are cut off from migration by private land diversions at lower elevations. A strong resident population is also found in Twelvemile Creek of the subwatershed by the same name. Upstream migration of bull trout in Twelvemile creek may still be precluded by one or more diversion structures below the Forest boundary. Brook trout have not been documented as present in Twelvemile Creek.

In the Lake Creek subwatershed, two resident bull trout populations exist; both are isolated from each other and from migration. One population exists in tributaries above and in Williams Lake; the other exists in Lake Creek between a natural barrier (falls) near the Salmon River and the dam/slide at the lake. These populations are experiencing risks due to sediment in the upper tributaries, development along the lake and irrigation diversions in lower reaches. Bull trout are also found in Williams Creek and its north and south forks.

In the Carmen Creek subwatershed, a strong resident population of bull trout is in Carmen Creek and may be present in Freeman Creek. Migration to and from the Salmon River is questionable due to irrigation diversions. As stated in bull trout Biological Assessment documentation done by federal land management agencies and cited in the Upper Salmon Bull Trout Problem Assessment (SBTA, 1998): “Fluvial population [of bull trout] may be present, but if lacking, is

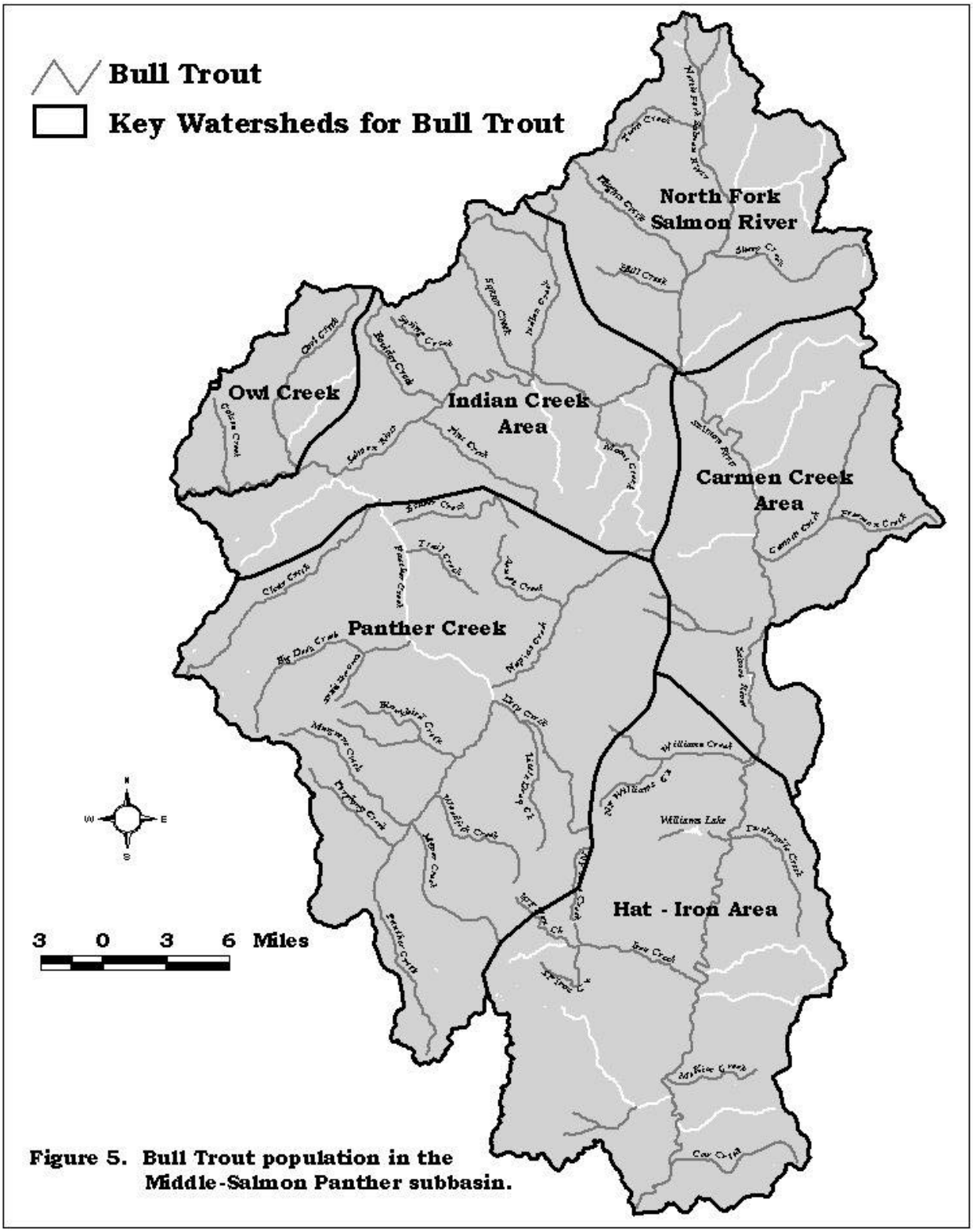

Figure 5. Bull Trout population in the Middle-Salmon Panther subbasin.

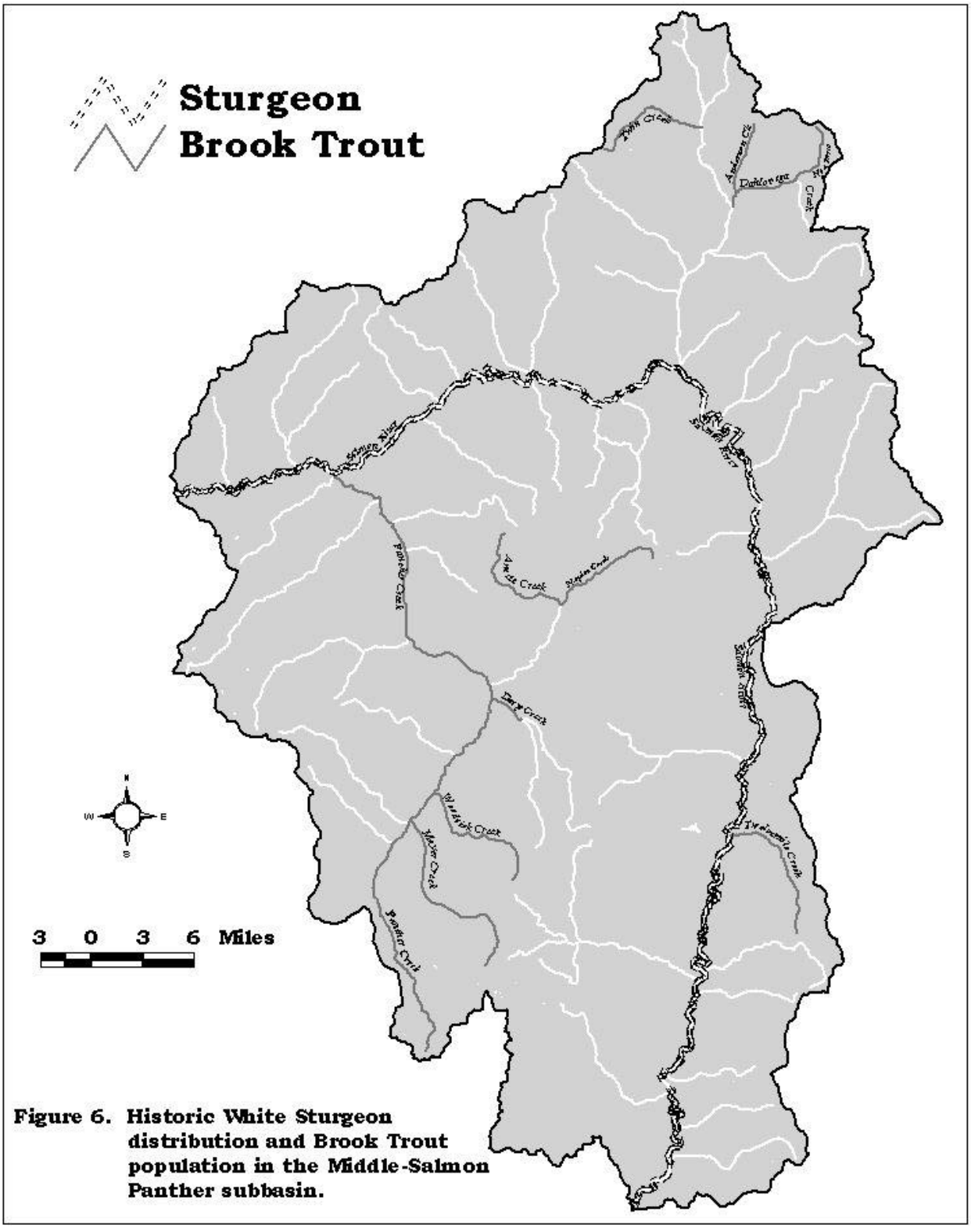

Figure 6. Historic White Sturgeon distribution and Brook Trout population in the Middle-Salmon Panther subbasin.

due to dewatering for irrigation purposes on private. Physical barriers, unscreened diversions, exist that create seasonal dewatering for irrigation purposes. Flow is impacted by water diversions on private lands and federal actions have no effect." There are no brook trout in the Carmen Creek system; however, resident cutthroat and rainbow trout are present.

The Tower Creek subwatershed groups Tower Creek, Fourth-of-July Creek, and Wagonhammer Creek together, though all are separate tributaries to the Salmon River. Fourth-of-July Creek and its tributary Little Fourth-of-July Creek probably contain a strong resident population of bull trout; however, none of the other streams do. Migration may be hampered by diversion structures in Fourth-of-July Creek.

The North Fork Salmon River watershed includes a number of tributaries, some of which have bull trout populations. The headwaters subwatershed includes that portion of the North Fork Salmon River from Johnson Gulch to Lost Trail Pass. Within this subwatershed, the very headwaters of the North Fork and Moose Creek contain bull trout; however, other tributaries do not. Hull Creek contains no bull trout as a five-acre pond on private land acts as a barrier. In the Sheep Creek watershed, Sheep Creek and its north and south forks all have bull trout. Bull trout are also found in Twin Creek. No bull trout are found in Hughes Creek and Dahlonega Creek watersheds. Dahlonega and Threemile Creeks have brook trout.

In the lower Salmon River section of the subbasin all the subwatersheds contain bull trout. In Middle Salmon subwatershed Boulder, East Boulder, Pine, and Spring Creeks contains bull trout. It is unknown whether or not Moose or Dump Creek have bull trout. In Indian Creek subwatershed, Indian, WF Indian, Corral, McConn, and Squaw Creeks all have bull trout in them. The remaining subwatersheds of Lower Salmon and Owl Creek contain bull trout.

Most major tributaries within the Panther Creek drainage contain bull trout. Exceptions include the lower Panther Creek below Deep Creek and Garden Creek. Brook trout are found in the entire length of Panther Creek and in Moyer and Woodtick Creeks. The upper Napias Creek and Arnett Creek also contain brook trout.

Salmon

The Salmon River is used as a migration corridor through the subbasin for anadramous fish including steelhead trout, sockeye salmon, and spring/summer Chinook salmon (SCNF, 1993). Most streams that are tributary to the Salmon River are critical habitat for Chinook. Various tributaries that are accessible are used, or were used when they were accessible, for spawning and rearing areas or as cold water refugia by steelhead and Chinook. The lower reaches of tributary creeks currently provide marginal habitat for anadramous fish as cold water refugia or in some cases limited spawning and/or rearing habitat for Chinook and steelhead. For example, recently juveniles of Chinook and steelhead have been seen in Moose, Dump, and East Boulder Creeks. The Salmon River provides migration

pathways for non-anadramous salmonids such as cutthroat and bull trout. Specific details regarding past and/or present access are discussed in the subwatershed characteristics section of this report. Sockeye migrating through the subbasin are extremely limited, with only one fish making it to Redfish Lake in 1998.

Rainbow/Steelhead

Rainbow/steelhead trout were at one time most widely distributed in the upper Salmon River portion of this subbasin (SBTA, 1998). Some headwater populations have become resident rainbows and no longer migrate to the river. Currently, most wild steelhead are entering tributaries down river from the North Fork Salmon River to spawn, including Shell, Long Tom, Colson, Garden, Owl, Panther, Pine, Spring, and lower Indian Creeks (USFS, 1999). Resident rainbow trout are strongest in the Pahsimeroi River, Lemhi River, and that section of the Salmon River near Challis. Overall, the Salmon River population of rainbows is low and somewhat limited in extent.

Cutthroat Trout

Westslope cutthroat trout, once found throughout the subbasin (Figure 7), are primarily limited to small headwater resident populations within the subbasin (SBTA, 1998). The migratory form of cutthroat trout is believed extinct. Westslope cutthroat trout are found primarily in the Panther Creek subwatershed, the North Fork Salmon River drainage and tributaries to the lower Salmon River (SBTA, 1998), including Colson, Owl, Garden, Clear, Panther, Pine, Spring, and lower Indian Creeks (USFS, 1999). Up river from the town of Salmon, cutthroat are also found in Twelvemile Creek, McKim Creek, and Allison Creek. Cutthroat are also found in Carmen and Freeman Creeks.

Other Fishes

Resident salmonids in the Salmon River include rainbow, cutthroat, and bull trout, and mountain whitefish. Mountain whitefish have relatively healthy populations throughout the subbasin. Non-salmonids in the vicinity include northern pikeminnow, redside shiner, chiselmouth, and several species of sculpin and suckers. According to the Forest Service, carp have been seen as far up-river as the Deadwater Area of the Salmon River, and smallmouth bass were caught near McKim Creek (Rose, 1999).

The upper reaches of East Boulder, Moose, and Dump Creeks are isolated from migratory fishes by high gradient breakland reaches that preclude movement (Rose, 1999). East Boulder Creek has an isolated population of cutthroat trout in the upper reaches that were introduced in the 1930s. It is believed that they are not Westslope cutthroat. The upper reaches of Moose Creek have an isolated population of rainbow trout possibly introduced at about the same time.

Recent Fish Collections

USGS collected fish through electro-fishing on the Salmon River near Cottonwood Campground just upstream from the Pahsimeroi River and near Fourth of July Creek (Maret, 1999) (see Appendix G).

USGS collected, measured and weighed Chinook, rainbow/steelhead, mountain whitefish, largescale sucker, mottled sculpin, shorthead sculpin, chiselmouth, longnose dace,

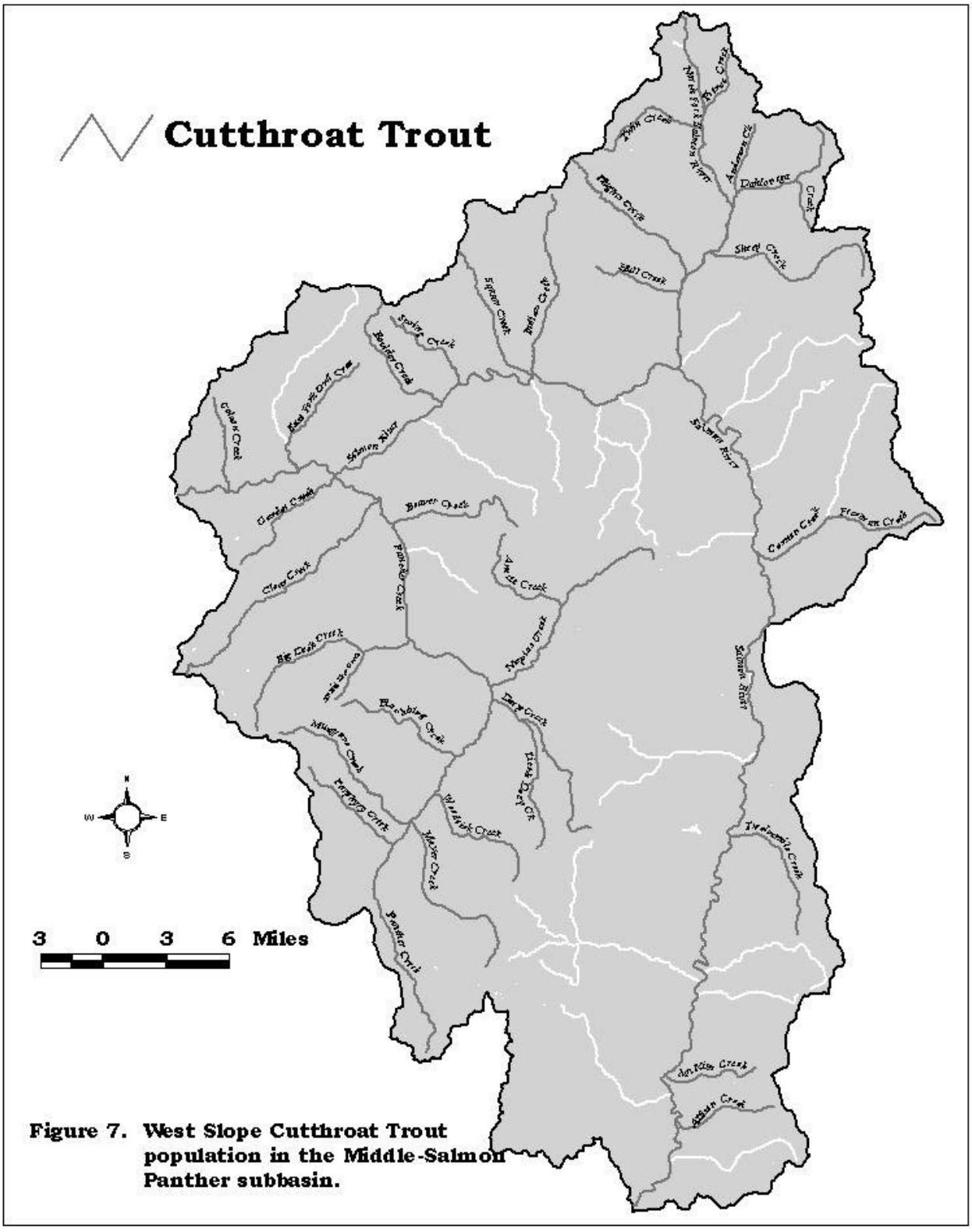

Figure 7. West Slope Cutthroat Trout population in the Middle-Salmon Panther subbasin.

speckled dace, northern pikeminnow, and redside shiner at the Cottonwood Campground location. At the Fourth of July Creek location, USGS collected, measured and weighed Chinook, cutthroat, rainbow/steelhead, mountain whitefish, largescale sucker, largescale x bridgelip sucker hybrid, mountain sucker, bridgelip sucker, mottled sculpin, shorthead sculpin, chiselmouth, leatherside dace, longnose dace, speckled dace, northern pikeminnow, and redside shiner.

Snorkel data collected by Idaho Department of Fish and Game (IDFG) from five sites on Panther Creek from Clear Creek to Moyer Creek during 1993-1999 show ranges of overall fish densities as follows:

Rainbow/steelhead	0.5 - 4.1 fish/100 square meters (m^2)
Cutthroat Trout	0.01 - 0.03 fish/100 m^2
Brook Trout	0.2 - 1.4 fish/100 m^2
Bull Trout	0.02 - 0.1 fish/100 m^2
Whitefish	0.3 - 2.4 fish/100 m^2
Chinook (juveniles)	0.02 - 0.05 fish/100 m^2

IDFG also documented the presence of dace, sculpin, and suckers; however, none were identified by species.

1.6 Land Ownership and Land Use

The majority of the subbasin is public land. The Salmon-Challis National Forest occupies 76% of the land area and 11% belongs to the Bureau of Land Management (BLM) (Figure 8). Private ownership within the subbasin constitutes approximately 6%. Private ownership of the area is generally concentrated in the Salmon River Valley near the city of Salmon.

The largest city located in this subbasin is Salmon, with a population of 3,393 (Idaho Department of Commerce, 2000). Smaller towns include North Fork, Carmen, Gibbonsville, and Shoup. The subbasin is completely included within Lemhi County (population: 8,030 people). Lemhi County includes area outside of this subbasin such as the Lemhi River subbasin and parts of Pahsimeroi River, Middle Fork Salmon River, Birch Creek and Little Lost River subbasins.

On average, the subbasin has had a 15% increase in population from 1990 to 1998 (Idaho Department of Commerce, 2000). Most of the population is concentrated within the Salmon River Valley. The lowlands are used primarily for agriculture (Figure 9). The agriculture lands are mainly used for livestock and hay production. Agriculture has been a major part of the economic base of the subbasin since the beginning of the century and continues to be a key industry in the area (SNF, 1982).

The increase in population has resulted primarily from the recreational opportunities the area provides: hunting, fishing, hiking, camping, and river rafting. As a result of this increase, some

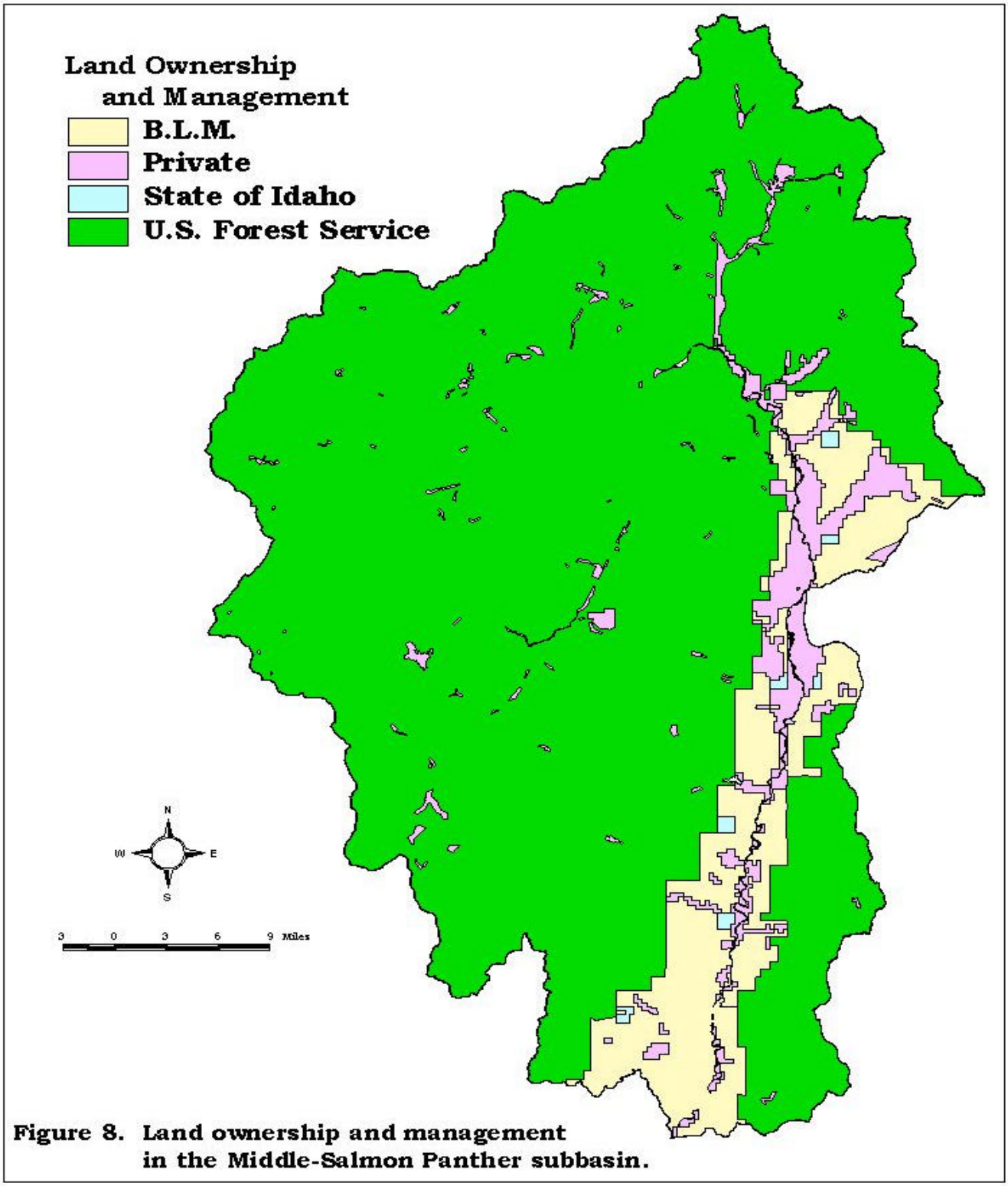

Figure 8. Land ownership and management in the Middle-Salmon Panther subbasin.

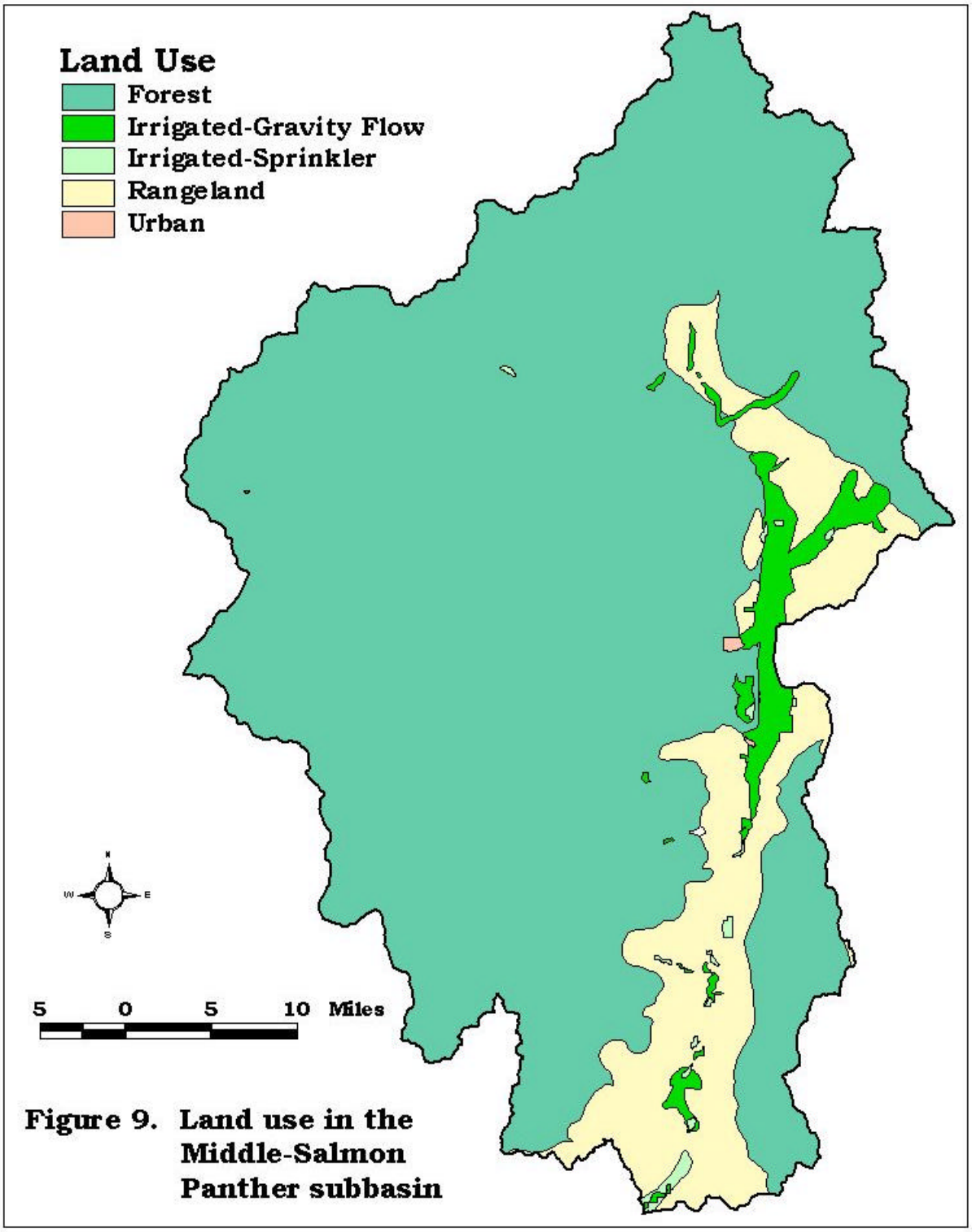

Figure 9. Land use in the Middle-Salmon Panther subbasin